

# GGOS Portal

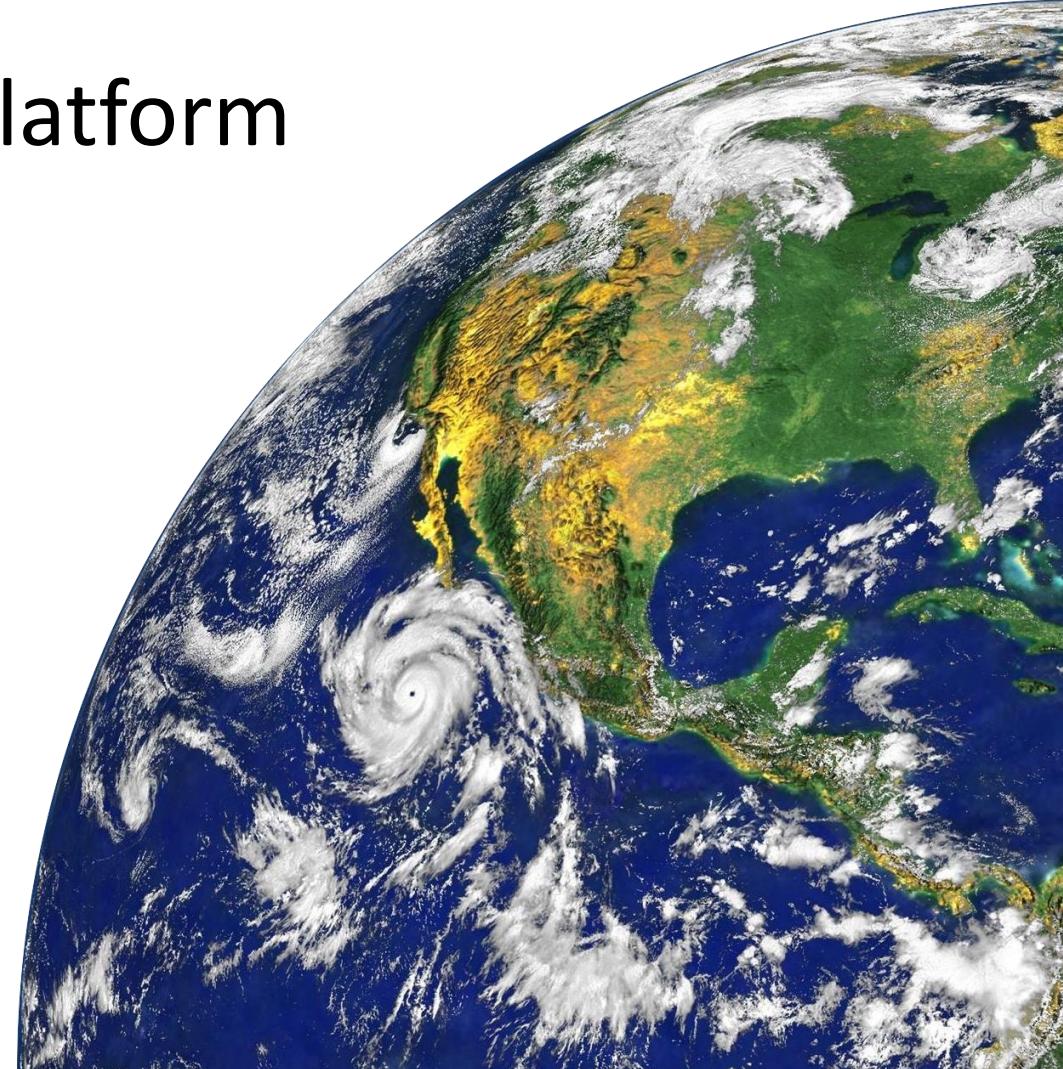
Advances in the future metadata platform  
for geodetic data and products

**Martin Sehnal** <sup>(1)</sup> and Lena Steiner <sup>(1, 2)</sup>

(1) BEV, Federal Office of Metrology and Surveying - Austria

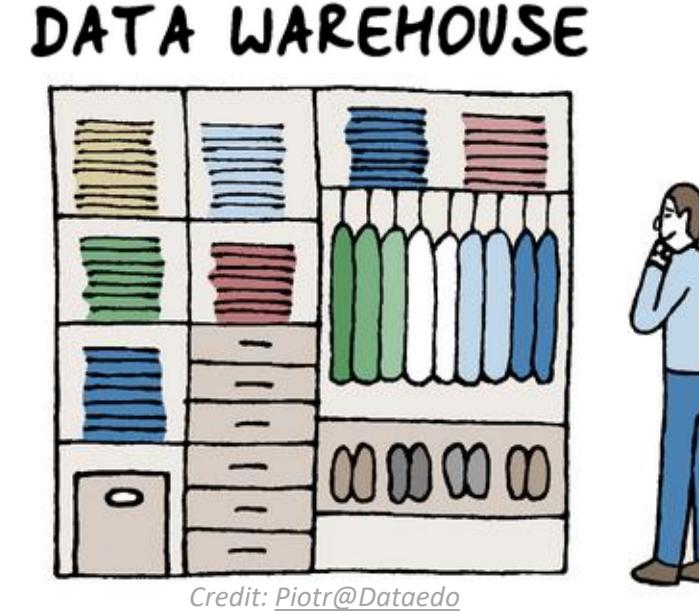
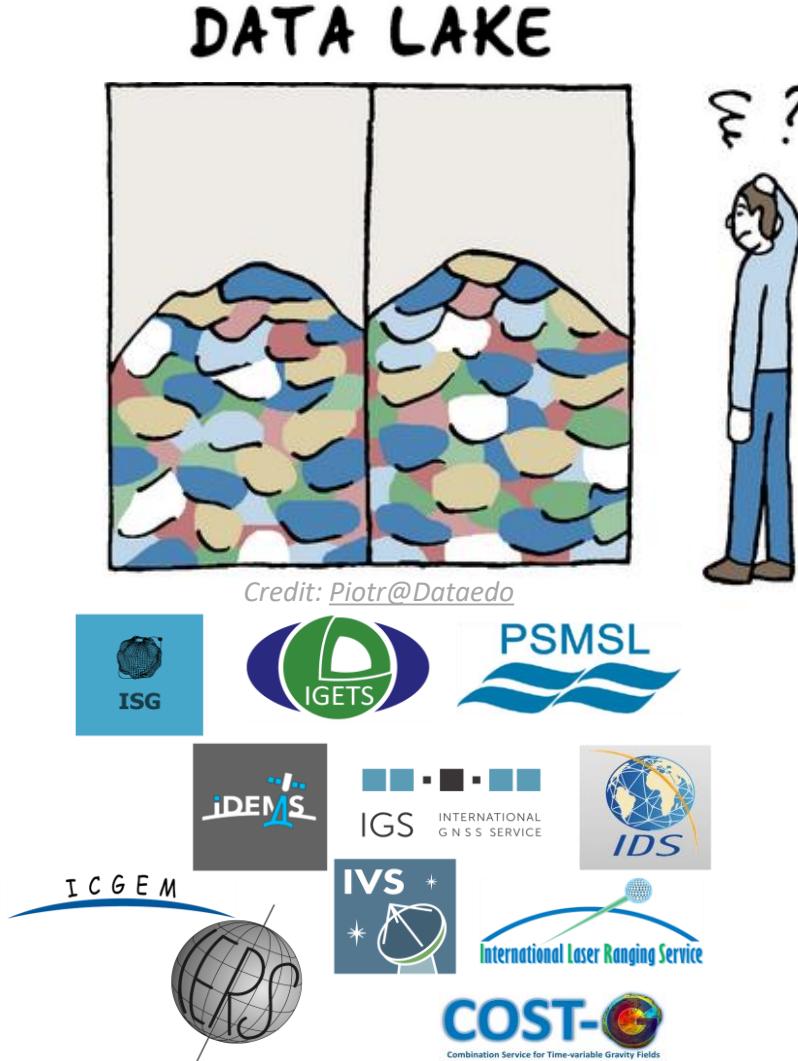
(2) TU Wien, Department of Geodesy and Geoinformation, Research unit Higher  
Geodesy - Austria

GGOS Days 2024  
Friday, October 11, 2024  
Potsdam, Germany



# Why do we need a GGOS Portal?

Federal Office  
of Metrology and  
Surveying

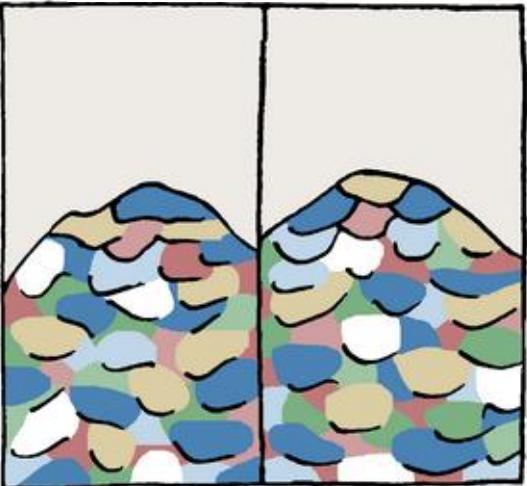


# How does it work?

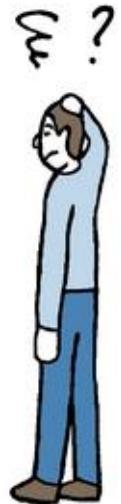
Federal Office  
of Metrology and  
Surveying



## DATA LAKE



Credit: Piotr@Dataedo



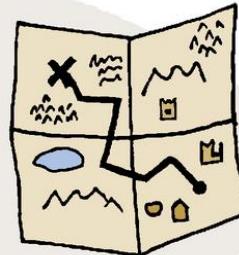
METADATA

## DATA

2023	9	1	60188	0.3053	0.4132
2023	9	2	60189	0.3059	0.4114
2023	9	3	60198	0.3065	0.4092
2023	9	4	60191	0.3071	0.4069
2023	9	5	60192	0.3077	0.4045
2023	9	6	60193	0.3084	0.4021
2023	9	7	60194	0.3090	0.3996
2023	9	8	60195	0.3096	0.3972
2023	9	9	60196	0.3101	0.3947
2023	9	10	60197	0.3105	0.3923
2023	9	11	60198	0.3109	0.3899
2023	9	12	60199	0.3112	0.3875
2023	9	13	60200	0.3115	0.3851
2023	9	14	60201	0.3117	0.3827
2023	9	15	60202	0.3118	0.3802
2023	9	16	60203	0.3119	0.3777
2023	9	17	60204	0.3119	0.3752
2023	9	18	60205	0.3119	0.3726
2023	9	19	60206	0.3119	0.3700
2023	9	20	60207	0.3118	0.3674
2023	9	21	60208	0.3117	0.3648
2023	9	22	60209	0.3116	0.3622
2023	9	23	60210	0.3115	0.3597
2023	9	24	60211	0.3113	0.3571

Credit: Piotr@Dataedo

## METADATA



Title	IERS Bulletin A
Content	IERS Bulletin A contains pole, UT1-UTC and their predictions for 1 year into the future
Format	ASCII
Description	<a href="http://hpiers.obspm.fr/">http://hpiers.obspm.fr/</a>
Data	section 1: DUT1 [sec], TAI [sec], UT1 [sec], UT2 [sec] section 2: x ["], y ["], UT1 ["], UT2 ["] <b>section 3: MJD, x ["], y ["], z ["]</b> section 4: dpsi, depsi ["], dx ["], dy ["], dz ["]

## DATA WAREHOUSE



Credit: Piotr@Dataedo

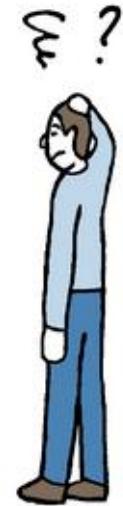
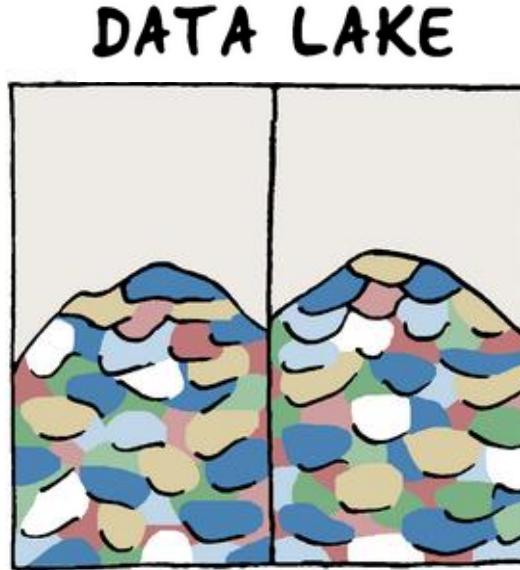


+ descriptions  
about techniques  
and products

+ Essential Geodetic  
Variables (EGV)

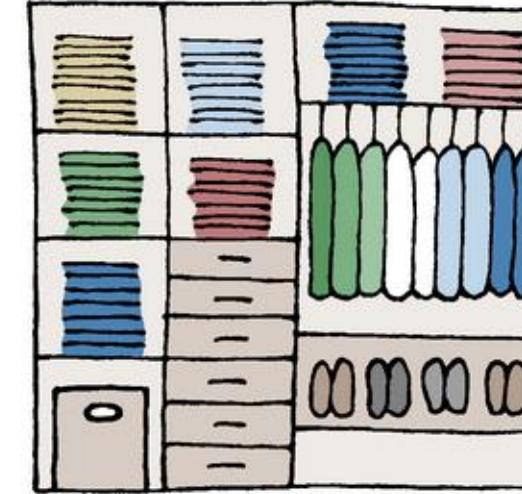
# How does it work?

Federal Office  
of Metrology and  
Surveying



Link back to  
original data

### DATA WAREHOUSE



Credit: Piotr@Dataedo



*„A unique acces point  
for all data, products and information  
relevant in the framework of GGOS  
for Earth Science and applications”*



# History of GGOS Portal

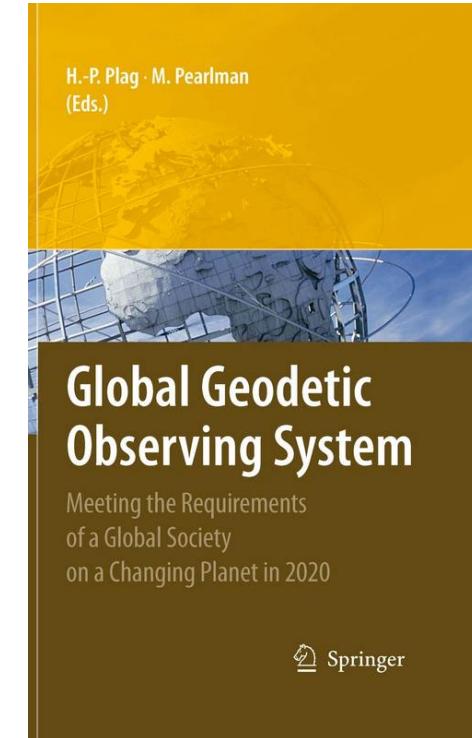
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Surveying



- 2007: **First idea** -> written down in GGOS Book
- 2009-2011: **First prototype** -> developed at BKG, Germany
- 2012: **Stop of developments**

A screenshot of the GGOS Portal interface. The top navigation bar includes links for Home, Administration, Contact us, Links, About, Help, User: Test User, and Logout. The main search area is titled "FIND INTERACTIVE MAPS, GIS DATASETS, SATELLITE IMAGERY AND RELATED APPLICATIONS". It features three main search panels: "WHAT?", "WHERE?", and "WHEN?". The "WHAT?" panel includes fields for Title, Abstract, Keywords, Map type (Digital, Interactive, Hard copy, Downloadable), and Search accuracy (Precise, Imprecise). The "WHERE?" panel shows a world map with coordinates for latitude (min: -88.2, max: 90) and longitude (min: -180, max: 178.2). The "WHEN?" panel includes options for Anytime, From, To, Restrict to Catalog, Group, Kind, Category, Options (Sort by Relevance, Hits per page 10, Output Full), and a "Search" button. Below the search area, there are sections for "CATEGORIES" (Applications, Audio/Video, Case studies, best practices, Conference proceedings, Datasets, Directories, Interactive resources, Maps &amp; graphics, Other information resources, Photo) and "RECENT CHANGES" (GeoRSS, metadata for testing, Template for Vector data in ISO19139 (preferred), Physiographic Map of North and Central Eurasia (Sample record)). The bottom section displays aggregate results and individual dataset details, such as "METADATA FOR TESTING" and "HYDROLOGICAL BASINS IN AFRICA (SAMPLE RECORD, PLEASE REMOVE)".

GGOS-Portal Screenshot – IAG Travaux Report 2007-2011



Chapter about the GGOS Portal in  
the “GGOS Book” [DOI: 10.1007/978-3-642-02687-4\\_9](#)

# History of GGOS Portal

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- 2022: Idea to **revive** the GGOS Portal
- **2023:**  
**Community survey**  
**Feasibility study**



GGOS Portal  
[ggos.org/portal](http://ggos.org/portal)

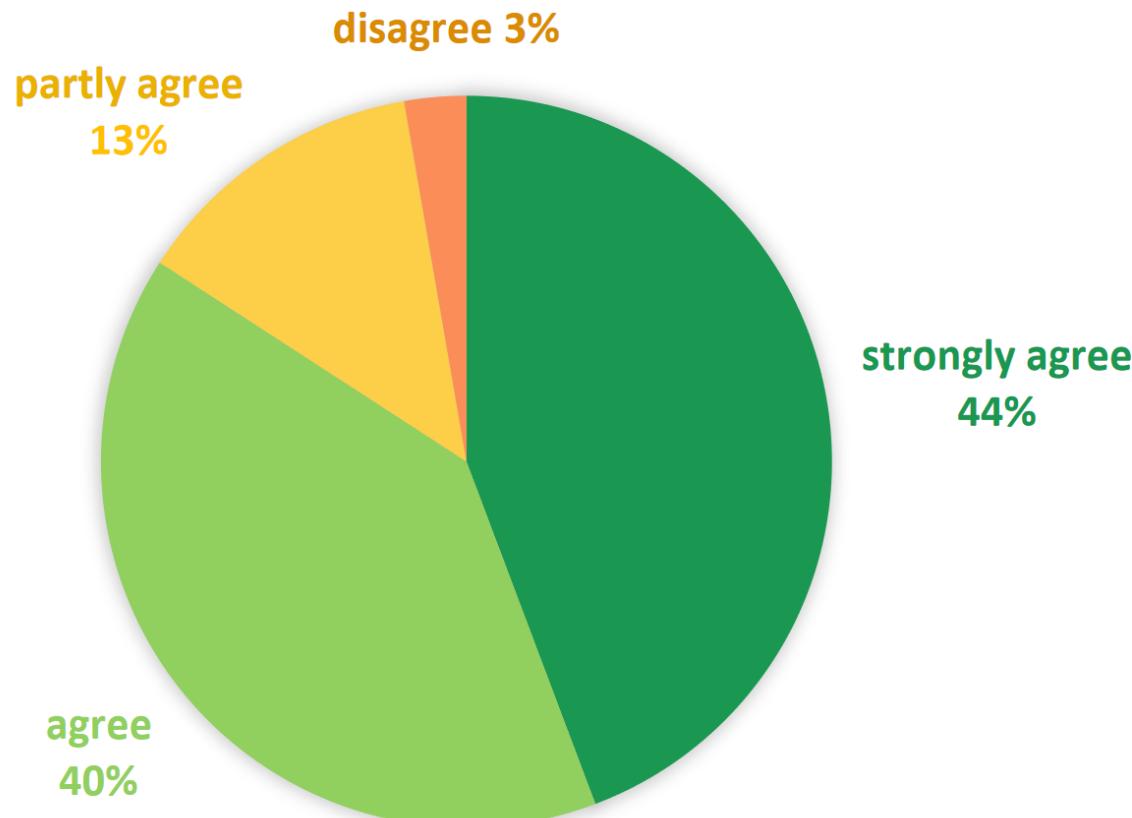


# Community Survey – USER Perspective

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Do you agree that a central point of access for  
geodetic data & products is missing?



GGOS Portal  
Survey Results  
[ggos.org/portal](http://ggos.org/portal)

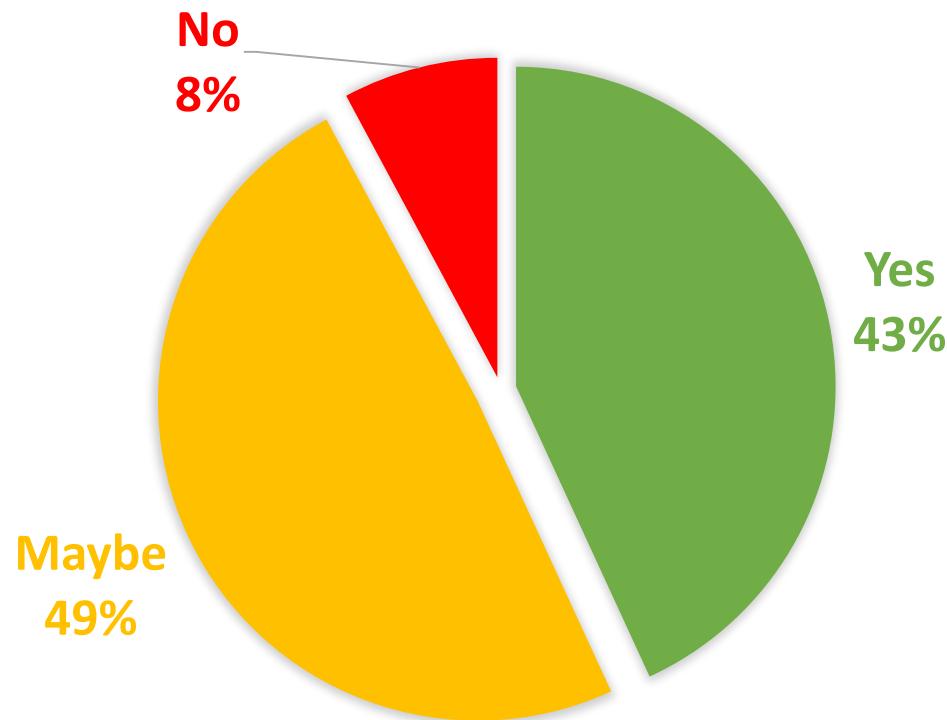


# Community Survey – DATA PROVIDER

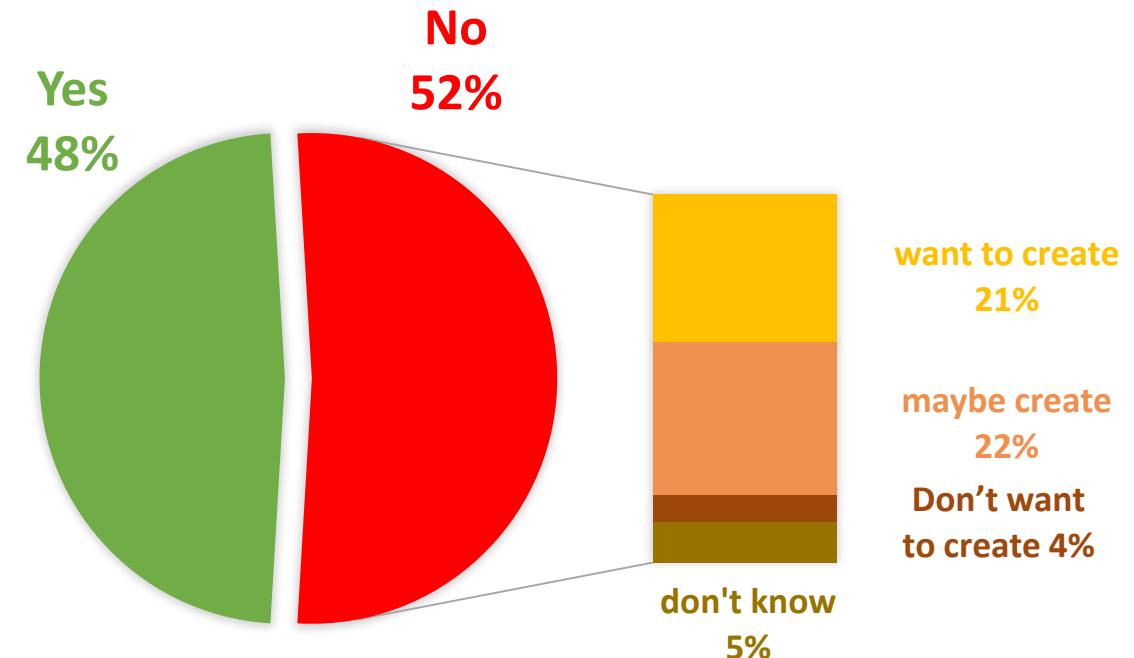
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Interest on publishing data  
at GGOS Portal?



Current availability of metadata?



GGOS Portal  
Survey Results  
[ggos.org/portal](http://ggos.org/portal)

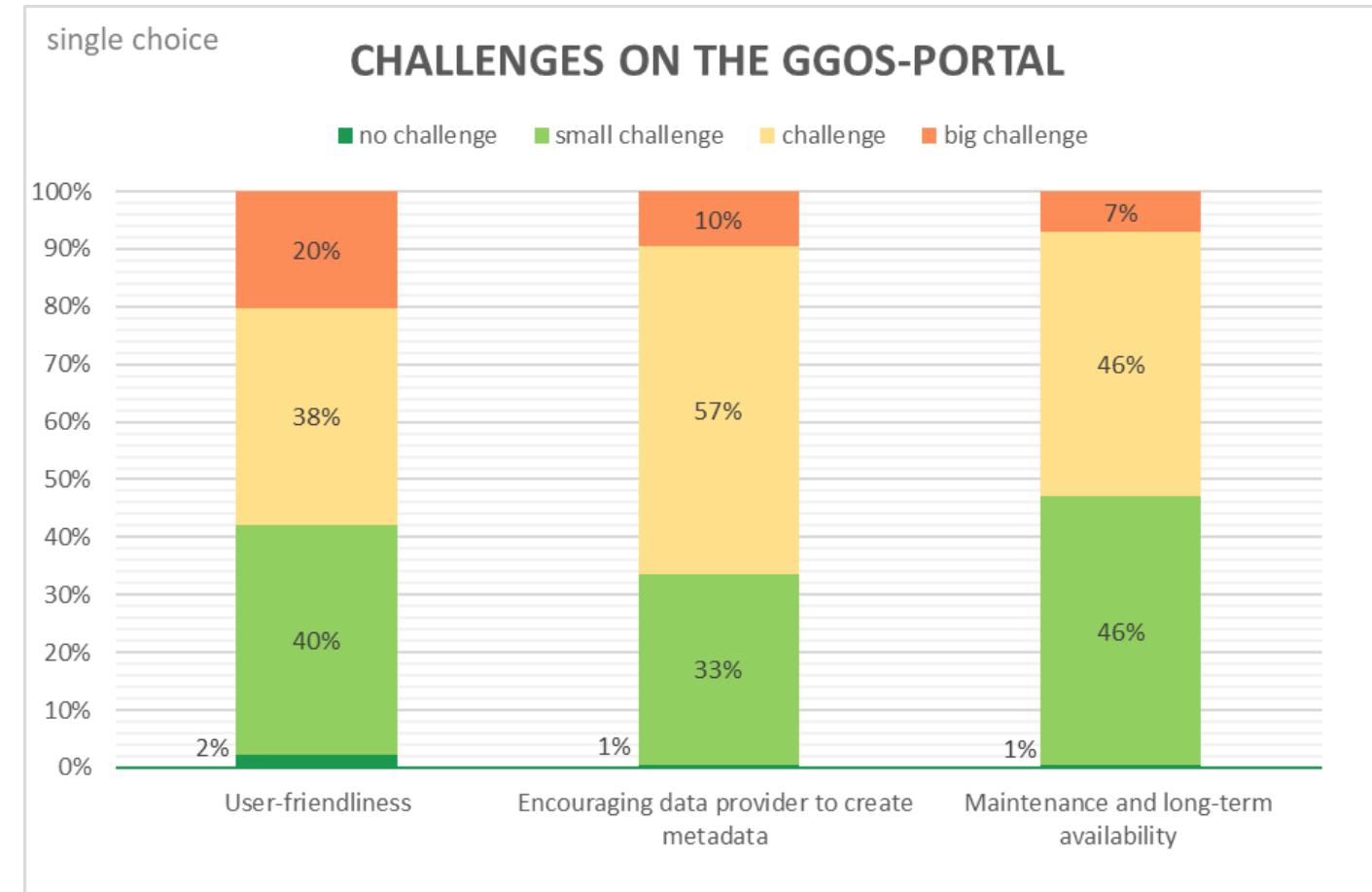


# Community Survey – CHALLENGES

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- **User friendliness**
- **Encourage data provider**  
to create metadata



GGOS Portal  
Survey Results  
[ggos.org/portal](http://ggos.org/portal)



# Feasibility Study

- Carried out in 2023
- By Lena Steiner (Bachelor Thesis, German only!)
- Cooperation: TU Wien – BEV



TECHNISCHE  
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WIEN  
Vienna University of Technology

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Bachelor Thesis: Steiner L. (2023)  
[DOI: 10.5281/zenodo.10255995](https://doi.org/10.5281/zenodo.10255995)



# SOFTWARE PACKAGE

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Surveying



- Geospatial Extensions are partly outdated and no longer maintained



- + Well established harvesting tools for geospatial data -> easier to implement
- + Continuous further developments  
-> Geonetwork UI & Microservices
- Recommended software package

The screenshot shows the GGOS Portal (Test Version) search interface. The search bar at the top contains the text 'Search ...'. Below the search bar are filter options: 'Type of resources' (Dataset 748, Service 28, Series 9), 'Spatial representation type' (Grid 531, Vector 110, Text, table 99, Grafik, Liste 2), 'Formats' (Available in: Download service 7, View service 51), and 'Keywords' (National 727, INSPIRE 500, Raster 428, AT.BEV 386, Höhe 356, Airborne Laserscanning 338, Fernerkundungsdaten 338, Digitales Oberflächenmodell 171, Digital Surface Model 170). The main area displays search results for digital elevation models (DTM and DSM) from the Bundesamt für Eich- und Vermessungswesen. Each result includes a thumbnail image, a title ('Serie ALS DTM Höhenraster 1m Stich tag 15.09.2021' or 'Serie ALS DSM Höhenraster 1m Stich tag 15.09.2022'), a brief description, and download links. A map view is visible in the bottom right corner.

GeoNetwork Search Surface (Initial tests with prototype for GGOS Portal)

# RECOMMENDATIONS

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types of metadata provision	Readability		Accessibility		
	human	machine	HTML	File	API*
<b>Text on website (HTML)</b>	yes	x	yes	x	x
<b>TXT (*.txt Sitelog)</b>	yes	x	x	yes	x
<b>XML (GeodesyML Sitelog)</b>	yes	yes	x	yes	x
<b>JSON</b>	yes	yes	x	yes	x
<b>Database (OAI-PMH,...)</b>	x	yes	x	x	yes

\*API – standardized interface to access  
web-database (e.g. OAI-PMH, RESTful, ...)

## Recommendations for metadata provision:

- ✓ **Format:** machine readable, like **XML**, **JSON** or **API** (database)
- ✓ **Interface:** **API** (OAI-PMH, RESTful, ...) or **downloadable file** (XML, JSON)
- ✓ **Standard:** **ISO19139/19115** (GML), **DublinCore**

or **xsl Transformation file** to your standard or new schema (xsd file)

# METADATA AVAILABILITY

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- Metadata information already available for a lot of geodetic data within IAG
- But a **majority not via machine readable format/interface: orange and red**

**Best practise  
example**

Metadataprovider	Format	Standard	Implementation	IERS	IGS	ILRS	IVS	IDS	PSMSL	ICGEM	IDEMS	IGETS	ISG	BGI	COST-G
GFZ Data Service	XML	ISO19139	OAI-PHM Harvester							+		+	+		~
BEV	XML	ISO19139	Geonetwork Harv												
NASA Earthdata	XML	ISO19115	XML File System Harv	~	+	+	+	+	+						
	JSON	Echo-API	Simple URL Harvester												
Datacite - DOI	XML	Datacite	XML File System Harv	*	*	*	*	*		+		+	+	*	+
	JSON	Datacite-API	OAI-PHM Harvester												
			Simple URL Harv												
Station Sitelog	XML	Geodesy ML	XML File System Harv	+	+	+									
	Sitelog	z.B. IGS													
IDEMS	XML	no standard	XML File System Harv								+				
CDDIS	HTML	no standard	no Harvester	+	+	+	+	+							
PSMSL Website	HTML	no standard	no Harvester						+						
IERS Website	HTML	no standard	no Harvester	+											

Implementation works

+ Large amount of geodetic data with metadata

Metadata Standard not supported  
(XSL and/or XSD file missing)

~ Small amount of geodetic data with metadata

No Implementation provided  
(HTML content cannot be harvested)

\* Little information in the metadata

# Best Practise Example

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- GFZ Data Service
- Provision via OAI-PHM API interface:

Service	Records	Datasets
ICGEM	45	Global Gravity Field Model
ISG	66	Regional Gravity Models
IGETS	26	Gravimeter Data



➤ Easy to integrate into GeoNetwork

The Combined Gravity Model GGM05C

GGM05C is an unconstrained global gravity model complete to degree and order 360 determined from 1) GRACE K-band intersatellite range-rate data, GPS tracking and GRACE accelerometer data, 2) GOCE gradiometer data (ZZ+YY+XX+XZ) ...

Center for Space Research The University of Texas at Austin, US

Complete

SGG-UGM-1: the high resolution gravity field model based on the EGM2008 derived...

SGG-UGM-1 is a static gravity field model based on EGM2008 derived gravity anomalies and GOCE Satellite Gravity Gradiometry (SGG) data and the Satellite-to-Satellite Tracking (SST) observations up to degree and order 2159. Block-diagonal normal ...

School of Geodesy and Geomatics, Wuhan University, China

Complete

ITU\_GGC16 The combined global gravity field model including GRACE & GOCE data...

ITU\_GGC16 is a static global gravity field model up to degree order 280 computed from the combination of ITU\_GRACE16 (up to d/o 180) and GO\_CONS\_GCF\_2\_TIM\_R5 (up to d/o 280) by collaboration of various national institutions (YTU, KOU, NEU, ...)

Istanbul Technical University (ITU), Turkey

Complete

The Combined Gravity Model GOCO05c

GOCO05c is a static global combined gravity field model up to d/o 720. It has been elaborated by the GOCO Group (TU Munich, Bonn University, TU Graz, Austrian Academy of Sciences, University Bern). GOCO05c is a combination model based on the ...

TU Muenchen, Institute of Astronomical and Physical Geodesy, Germany

Complete

Harvested metadata from GFZ Data Service with GeoNetwork (via OAI-PHM interface)

# GGOS Portal – Future Realisation

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**Start development in 2025**

Strategy including IAG metadata:

- 1. Include already available metadata (machine-readable)**
  - API Interface (OAI-PMH)
  - Downloadable files (XML, PMH)
- 2. Release a first version of GGOS Portal**
- 3. Encourage data provider to create machine-readable metadata**



# Thank you for your attention!

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GGOS Portal  
[ggos.org/portal](http://ggos.org/portal)

